Pervasive Collaborative Computing Environment (PCCE)

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Summary

Collaboration is not accomplished only through a single interaction mode, such as face-to-face conversation. Within a collaboration communication usually progresses through several interaction modes including email, telephone calls, videoconferencing, and meetings. Light-weight presence and interaction tools, support for synchronous and asynchronous interactions, and support for sharing of day-to-day activities are essential to a successful collaboration environment. In the Pervasive Collaborative Computing Environment project we are researching and building the environment required to support the daily activities of scientific collaborations.

1. Introduction

Collaboration among scientists spread worldwide is critical to modern big science. Projects like the Fusion Collaboratory, the Compact Muon Solenoid (CMS) detector, the Atlas detector, and the Global Accelerator Network (GAN) need to coordinate the activities of a worldwide collaboration.

Collaborators need to be able to find and contact other participants, chat, leave notes, share and edit documents, track current workflow, and activate videoconference sessions, dynamically as needed. In addition, the tools for this shared space must, where necessary, accommodate asynchronous interactions between participants not present within the space at the same time.

The purpose of this PCCE project is to develop and deploy software tools that support a persistent collaborative "space" within which participants can rendezvous and interact with each other. Privacy and security play a major role in acceptance of collaborative technologies and are addressed in the fundamental system, but the ad hoc and incremental growth of collaborations make this difficult.

Many collaborations are organized around a common computational goal. We are also building a set of software tools, collectively known as workflow-management tools, that describe, mediate, and monitor these computing activities.

2. Progress to Date

Our concentration in the first part of the PCCE project was on building the collaboration framework and establishing prototype versions of the base set of tools required for the environment. The foundation of the PCCE environment consists of presence, contact, text messaging, and workflow tools. These capabilities allow users to collaborate securely by running a lightweight interface that requires no additional hardware. It can be run continuously on each user's desktop.

The PCCE environment leverages existing and emerging tools, such as grid services, the Jabber XMPP protocols, BPEL4WS, Web services, and videoconferencing capabilities. An essential underlying element of our work is a security model that takes into account the real security needs of scientific collaborations and provides flexible authentication and authorization mechanisms. Based on our experience with collaborations, this environment is an essential but missing component of the continuum of collaborative capabilities available today.

Furthermore, since collaborative tools are increasingly centered on large-scale computing activities, shared collaborative control and monitoring of these tasks is needed. We are implementing workflow-management tools that allow shared management of a collaboration's computing activities. These tools are based on Web services and are being deployed in the DOE Science Grid computing environment.

3. Future Directions

Our next focus will be on the development and integration of tools required to improve the flexibility of our secure collaboration environment, extend the workflow capabilities, improve our archiving, and implement shared text editing. The new PCCE environment will provide a secure persistent space that will allow participants to locate each other, use asynchronous and synchronous messaging, collaboratively define and interact with computational workflows, share editing of documents, share progress and results, share applications, and hold videoconferences.

For further information on this subject contact:

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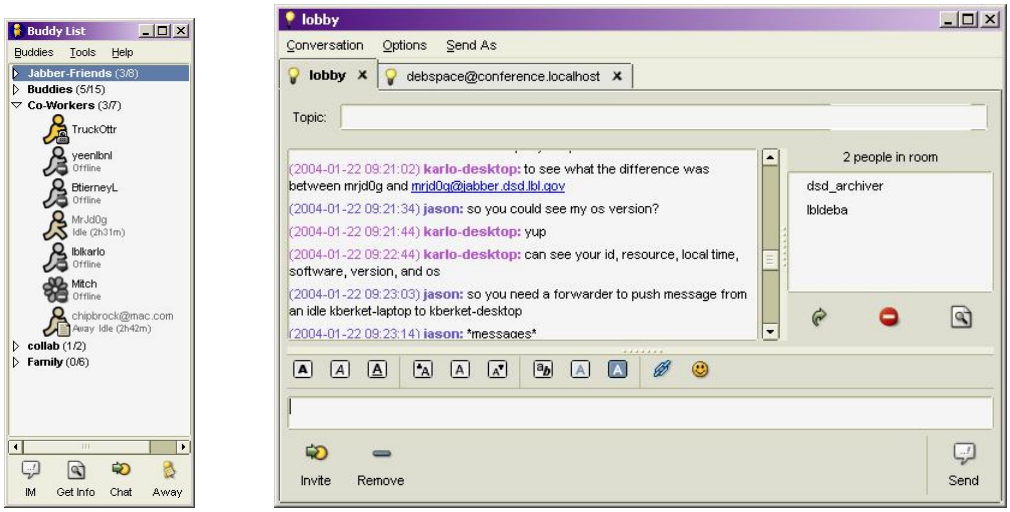

Figure 1: PCCE secure presence and messaging interface